DOCUMENT RESUME

ED 247 507 CG 017 669

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TITLE Test Anxiety and Causal Attributions Following Success and Failure in an Achievement Situation.
PUB DATE May 84
NOTE 33p.; Paper presented at the Annual Meeting of the Midwestern Psychological Association (55th, Chicago, IL, May 3-5, 1984). This research is part of the author's doctoral dissertation.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Attribution Theory; Cognitive Ability; College Students; Failure; Higher Education; Performance Factors; Success; *Test Anxiety

ABSTRACT

High-test-anxious individuals have been found to perform less well on cognitive tasks than others of comparable ability. To investigate the relationship between test anxiety and causal attributions following success and failure in an achievement situation, 200 introductory psychology students completed the Test Anxiety Scale (TAS) and were randomly assigned to a success or failure condition involving an anagram task. Analysis of results showed that test anxiety was significantly correlated with items constructed to measure causal attributions. High-test-anxious subjects believed that when they failed, they did so because of a general lack of ability. Regardless of condition, high-test-anxious subjects attributed their performance to finding most tasks difficult. They reported that their performance was caused by exerting more effort following failure, bad luck following success, being in worse moods after success, and experiencing more time pressure. Thus, negative cognitive and emotional components, in addition to worry, off-task thinking, and emotional arousal, appear characteristic of the high-test-anxious person's experience. The findings suggest that test anxiety also includes a tendency to personalize failure, minimize success, and in general to experience testing situations negatively. (Author/JAC)

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Test Anxiety and Causal Attributions Following Success and Failure In An Achievement Situation [1]

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May, 1984

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[1] This research was a portion of the author's doctoral dissertation which was completed at the Ohio State University.

Paper presented at the meeting of the Midwestern Psychological Association, Chicago, Ill.

CG 017669

Abstract

This research investigated the relationship between test anxiety and causal attributions following success and failure in an achievement situation. Subjects were 200 introductory psychology students whose participation partially fulfilled course requirements. Results of correlational analysis showed that test anxiety was significantly correlated with items constructed to measure causal attributions. High-test-anxious subjects believed that when they failed, they did so because of lacking general ability to a greater extent than low-test-anxious subjects. Regardless of condition, high-test-anxious subjects to a greater extent than low-test-anxious subjects attributed their performance to finding most tasks difficult. The attribution items differentiating these groups were general rather than specific. This suggests an unchanging and negative perception of personal causality and efficacy by high-test-anxious subjects.

High-test-anxious subjects in comparison to low-test-anxious subjects reported their performance was caused by exerting more effort following failure, bad luck following success, being in worse moods after success and because of experiencing more time pressure. Thus, negative cognitive and emotional components, in addition to worry, off task thinking and emotional arousal, appear characteristic of the high-test-anxious person's experience. The data reported here suggest that test anxiety also includes a tendency to personalize failure, minimize success and in general experience testing situations negatively. Relevant methodological and treatment issues are also discussed.

Individual performance in an achievement situation is evaluated by self or others in terms of some standard of excellence. The consequences of performance are either a favorable evaluation (success) or an unfavorable evaluation (failure; Atkinson, 1964). Scholastic testing is a common achievement situation. Test anxiety is one of the many factors which may influence test performance.

Mandler and Sarason (1952) were the first to study the test anxiety construct. Their pioneering efforts and other investigations of similar constructs (Child & Waterhouse, 1952; Waterhouse & Child 1953; Williams, 1955) have stimulated a considerable amount of research. Krohne & Lauz (1982), Sarason (1980) and Wine (1971, 1980,1982) are sources of excellent reviews of this literature.

High-test-anxious individuals have been found to perform more poorly on cognitive tasks than do less test-anxious individuals of comparable ability. This is particularly true if tasks are difficult and are undertaken in a stressful and evaluative environment (Wine, 1982). A cognitive direction-of-attention model of test anxiety has generally been supported by research. High-test-anxious individuals' poor performance can be explained by their attention to task irrelevant and usually self deprecatory cognitions. Information processing capacity is also decreased due to attempting to work under stress. In addition, test anxiety has been shown to consist of both worry and emotionality, with the former resulting in most task interference (Wine, 1982). High and low-test-anxious individuals have also been found to differ in their response to success and failure feedback. After failure, high-test-anxious individuals are likely to perform more poorly than before, while low-test-anxious individuals' performance improves. After success the reverse is true, with high-test-anxious individuals performing better and low-test-anxious individuals performing worse (Wine, 1980).

Doris & Sarason (1955), in an early examination of individual differences in attributions of causality, found that high-test-anxious subjects blamed themselves more for a manipulated failure than did low-test-anxious subjects. Similar findings were obtained by Weiner and Potepan (1970). Test anxiety was positively correlated with attributing failure to ability while negatively correlated with attributing success internally. In a later study, Nicholls (1976) examined the correlations among test anxiety (worry) and the causal attributions children made for success and failure. For girls, attributing success to ability was negatively correlated with text anxiety (worry), while attributing failure to ability was positively correlated with text anxiety (worry). Causal attributions for success to teacher assistance was positively correlated with test anxiety (worry), and attributions for failure to bad luck was negatively correlated with test anxiety (worry). For boys,test anxiety (worry), and somatic signs of anxiety were not signi.icantly related to attributions.

In a more recent study, Arkin, Detchon & Maruyama (1982) examined the relationships among attributions, test anxiety and other variables. Their findings were essentially consistent with earlier research. In addition,high-test-anxious subjects felt their effort was less effective and regarded themselves as having less ability than low-test-anxious subjects regardless of success or failure experience. Except for these studies, little empirical attention has been paid to the specific relationships among test anxiety and causal attributions (Dweck & Wortman, 1982), or between anxiety in general and causal attributions (Weiner, 1982).

There has been considerable research interest in possible differences in the attributional styles individuals use to explain their performance in achievement situations. An attributional style is the general predisposition an individual has to internalize or externalize causal responsibility for positive or negative outcomes (Ickes & Layden, 1978). Attributional style differences, following the experience of success and failure, have been empirically examined for depression (Anderson, Harowitz, & French, 1983; Kuiper, 1978; Rizley, 1978; Seligman, Abramson, Semmel & von Bayear, 1979); self-esteem (Fitch, 1970; Ickes & Layden, 1978; Miller, 1976); initial confidence (Feather, 1969; Simon & Feather, 1973); expectancy of success (McMahn, 1973); internal-external locus of control (Gilmore & Minton (1974); high resultant achievement motivation (low test anxiety; Kukla, 1972, 1974; Murray & Mednick, 1975; Weiner, 1972, Weiner et.al., 1971; Weiner & Potepan, 1970); psychiatric rehabilitees and college students (Menapace & Doby, 1976); and the general effects of success and failure (Arkin & Maruyama, 1979; Davis & Stephan, 1980; Loginbuhl, Crowe & Kahan, 1975).

Apparently attributional style differences are common. Individuals scoring on the more "negative" or "disturbed" end of the variable examined assume more personal responsibility for failure and less personal responsibility for success than those scoring more "positively" or "normally". Individuals scoring on the more "positive" end of the variable examined tend to assume more personal responsibility for success and less personal responsibility for failure than more "negative" scorers. Attributional styles appear to be an important underlying component of these variables.

The purpose of this research was to further examine the relationships among test anxiety and causal attributions following success and failure. The causal attribution model of performance in an achievement situation proposed by Weiner and his colleagues (Weiner et.al., 1971; Weiner, Russell and Lerman, 1978) as expanded upon by Abramson, Seligman, & Teasdale (1978) was applied.

According to Heider (1958), an "attribution is the linking of an event with its underlying conditions" (p. 89). Attribution theory is concerned with how people explain their own or others' behavior and the consequences which follow from these explanations.

Weiner and his associates propose that people use four causal attributions to interpret and predict the outcome of an achievement situation. The four causal attributions are ability, effort, task difficulty and luck. Individuals assess their own or others' ability level, amount of expended effort, task difficulty, and the magnitude and direction of luck to explain performance. Ability and effort are person qualities and task difficulty and luck are characteristics external to the person. Task difficulty and ability are relatively unchanging and effort and luck are variable. Locus of control (internal or external) and stability (stable or unstable) dimensions subsume the four elements of the model. This particular model and other attribution models have been conceptually applied to explain some of the negative effects of test anxiety on performance (Arkin, Detchon & Maruyama, 1982; Dweck & Wortman, 1982; Green 1980; Phillips, 1980; Weiner, 1982; Wine, 1980,1982).

Weiner's model has been expanded to include a third dimension by Abramson, Seligman and Teasdale (1978). They hypothesize that whether or not the attributed cause is general (global) or specific has important implications for the consequences which follow from making attributions. For example, attributing failure on a math test to lack of intelligence (an internal, stable, general attribution) rather than attributing math test failure to lack of mathematical ability (an internal, stable, specific attribution) has different meaning and implications for future task performance. In the first case future performance on a different task would be impaired. In the second case, future performance on a different task should not be impaired. Impairment of future performance in both cases can be expected if the second task is similar to the first.

The present research further examines how high and low-test-anxious individuals may differ regarding the attributions they use to explain success and failure in an achievement situation. The high-test-anxious individual is expected to elicit self-deprecatory and worrisome task irrelevant and interfering cognitive responses when the evaluative nature of a testing situation becomes salient. They are expected to attribute failure to lack of ability and attribute success to having been lucky or the task being easy (internal and external attributions respectively). The high-test-anxious individual's attributional style is assumed to maximize personal responsibility for failure and minimize personal responsibility for success. Generality and specificity of attributions may contribute to this process. Following failure personal responsibility would be maximized by

attributing failure to a global personal characteristic or ability, rather than a specific task related ability. The high-test-anxious individual is expected to make general rather than specific ability attributions to account for failure. High-test-anxious individuals are expected to avoid personal responsibility for success by attributing success to the task being easy (a specific, external, stable attribution) or to being lucky. Denial of personal responsibility would be further enhanced by believing that everyone was lucky (a general, unstable, external attribution) rather than believing the individual alone was lucky (a specific, unstable, external attribution).

Low-test-anxious individuals are expected to elicit task relevant cognitive responses when the evaluative nature of a testing situation becomes salient. They are expected to maximize personal responsibility for success and minimize personal responsibility for failure. Low-test-anxious people are expected to attribute task failure to lack of effort (an external factor), and attribute task success to ability and/or effort (internal factors). Following success they are expected to make general effort and ability attributions. Following failure, they are expected to make more specific lack of effort attributions.

Method

Subjects

Subjects were 200 introductory psychology students whose participation in this study partially fulfilled course requirements. Ninety subjects were men and the remaining 110 subjects were women. All subjects attended two experimental sessions. During the first session subjects were reminded this was the first of two studies they had volunteered to participate.

Procedures

The Test Anxiety Scale (TAS; Sarason, 1972), other personality inventories and a short biographical data sheet were administered to subjects in groups ranging in size from 20 to 80, on the first day of the study by the author or an assistant. After completing the TAS, subjects were then grouped by sex, rank ordered based on their TAS score, and randomly assigned to either the success or failure condition. This was done by grouping the rank ordered subjects by twos and assigning the first subject to a condition based on a flip of a coin. The second subject was placed in the other condition. This process occurred after each administration of the TAS. Based on this procedure, and taking into account the actual number of subjects who completed all parts of this study, forty-five men and fifty-two women were in the success condition. Forty-five men and fifty-eight women were in the failure condition. Of the original 210 subjects, seven subjects assigned to the success condition and three subjects assigned to the failure condition were eliminated from the sample. In the success condition four subjects recorded responses incorrectly on the answer sheets, two subjects

did not show for the second session, and one subject had incomplete materials. Of the three subjects in the failure condition eliminated from the sample, two left the same second session early, and the remaining subject had substantial missing data. The two persons who left the session early were men, otherwise there were no important sex differences in subjects eliminated from the sample. Subjects completed the second session in groups of seven to thirty on an average of eight days after finishing part one. The author conducted all of these sessions.

Success and Failure Induction

Subjects attempted a series of ten six-letter anagrams. When working on an anagram task, subjects are presented with a list of words where the letters forming each word are mixed. The subject's objective was to unscramble each anagram within a limited amount of time. An anagram task was desirable in this study because it readily lends itself to a variety of methods for manipulating perceived success or failure. Subjects were given thirty seconds to work on each anagram. The following anagrams were presented to subjects in random order: middel, emagle, rfathe, innerd, cadnle, secnod, verbla, alsegt, feslni, upslon.

Perceptions of success and failure were manipulated in this study as follows. All subjects were presented with the previously described series of ten anagrams in booklet form, one anagram per page. Four anagrams were unsolvable and six anagrams were relatively easy. (See Feather, 1966, for normative information on the easy anagrams.) Subjects in the success condition were informed prior to attempting the anagrams that a similar group of introductory psychology students' average performance was approximately

four correct. In a similar manner, subjects in the failure condition learned that the introductory psychology students' average performance was about eight correct. These "norms" were considered believable during pretesting.

Written instructions were used to induce perceptions of success and failure at an individual level. After completing a short biographical data sheet and answering a few questions, subjects in groups consisting of persons in both conditions read the following paragraphs to themselves:

> The tasks you are about to perform are anagrams - words whose letters are not in the correct order. As soon as you are given the signal for each anagram, try to reorder the letters so that they spell a meaningful English word. For example, if you were presented with the item "atc", your task would be to rearrange the letters so that they would make a meaningful English word. In this case the correct solution to the anagram is the word "cat" or "act". As soon as you have solved the anagram, write the word in the space provided. You will work on two sets of ten anagrams. Each anagram has six letters. Every anagram is on a different page, and you will have 30 seconds to work on each anagram.
>
> Guidelines for Evaluation of Scores - First Set of Anagrams:
>
> The group of anagrams you are about to work on were carefully selected and pretested in order to determine their difficulty level. Based on an analysis of Psychology

100 students' performances under similar conditions during spring, winter and fall quarters of 1978, we have learned that most students were able to correctly solve approximately (4 or 8) of the following ten anagrams. In fact, it was unusual for a person to solve correctly (5 or more, less than 7) of these anagrams. It is likely that your performance will be similar to that of other students. We do not have this kind of information for the second set of anagrams you will be working on.

After answering a few questions subjects were reminded of the norms by reading to themselves this paragraph:

You will have 30 seconds to work on each of the following 10 anagrams. Do not start working on an anagram until told to do so. When you have solved an anagram, write the correct solution in the space provided on the page. You may use the extra space on each page for your work. Do the best you can. Again, most people were able to correctly solve approximately (4 or 8) of these anagrams.

Assuming subjects in both conditions were equally able to solve the anagrams, performance in both groups should have averaged close to six anagrams correctly solved. (The number of easy anagrams.) Performance in both groups was expected to be the same. However, the meaning subjects attached to their performance was expected to vary as a function of group assignment. Six anagrams correct for those in the success condition, who believed average performance was close to four anagrams correct, should have been perceived as successful. Six anagrams correct by those in the failure condition, who believed average performance was close to eight anagrams correct, should have been perceived a failure.

Attribution Measurement

Ability, effort, task difficulty and luck attributions were measured following task completion. Likert scales were used to assess attributions because they are the least theoretically bound of various possible measurement techniques (percent allocation, paired comparison, Likert scale). This measurement approach is supported by Elig and Frieze (1979), who conclude from their comparative study of alternative measurement strategies for assessing attributions, that Likert scale methods are preferred because of various statistical concerns and construct validity. Work by Frieze (1976) indicates that mood is also an attribution subjects often use to explain their behavior. Results of pilot testing showed that subjects attributed their performance to time pressure. Accordingly, time pressure and mood attributions were also measured. Attribution items consistent with Weiner's model and attribution items that incorporated the general-specific dimension suggested by Abramson, Seligman and Teasdale (1978) which were meaningful for both the success and failure conditions, were constructed.

Subjects were asked: "To what extent was your performance on the anagram due to each of the following?" They then rated each of 29 attribution items on a 9 point Likert scale (1 = not at all, 5 = somewhat, 9 = a great deal). For example, the task ease attribution items subjects responded to were:

anagrams being difficult or easy (from Weiner's model)

your finding the anagrams easy (external, stable, specific, success)

your finding the anagrams difficult (external, stable, specific, failure)

your finding most tasks easy (external, stable, general, success)

your finding most tasks difficult (external, stable, general, failure)

Subjects were carefully debriefed immediately after completing part two of the study. The primary focus of the debriefing was eliminating the effects of the success and failure manipulations. Debriefing effectiveness was evaluated by having subjects complete a debriefing effectiveness questionnaire. These group sessions typically lasted thirty minutes. Subjects were asked not to discuss the purpose of this study with others.

Results

To test for group equality on relevant variables, and reduce the possibility of some alternative explanations for study results, possible group differences between the success and failure conditions in age, grade point average, the number of days between sessions one and two, and TAS scores were assessed. Results of t-tests showed no significant differences between conditions on these variables. (See Table 1). It was also crucial for the purpose of this study that perceptions of success and failure on the anagrams task be manipulated independently from actual task performance. Results of t-tests showed no significant differences between the success and failure conditions on the actual number of anagrams subjects correctly solved (success: $\bar{x}$ = 5.1, SD = .9; failure: $\bar{x}$ = 5.2, SD = .9; t = .3, p = .8).

Insert Table 1 Here

Perceptions of success and failure following completion of the anagrams task were measured by three Likert items shown in Table 1. Differences between the success and failure conditions are statistically significant and in the expected direction.

Preliminary analysis included breaking down the complete sample by sex so that the possibility of sex differences in obtained results could be investigated. Because no important sex differences were found, results are reported for both sexes together. Correlational analysis was used to determine the extent of the relationship between test anxiety and attributions within the success and failure conditions. The means, standard deviations, sample sizes and group differences between the success and failure conditions are displayed in Table 2. Examination of these data show that in comparison to subjects who experienced failure, subjects who perceived their anagrams task performance a success scored more positively on items attributing their performance to having high general ability, high anagram solving ability, finding the anagrams easy, finding most tasks easy, working hard or not working hard, trying hard while working on the anagrams, usually trying while working on a task, having good luck on the anagram task today, and not feeling pressured by the time limit.

Insert Table 2 Here

The correlations between test anxiety and causal attributions are displayed in Table 3. After failure, a strong positive correlation is observed between test anxiety and the attribution item "your having low general ability". After success, test anxiety is negatively correlated with "your having high general ability", and positively correlated with

"your having low general ability". These results show that as test anxiety increases, it becomes more likely for a subject to attribute failure to a general lack of ability, and less likely that a subject attribute success to high general ability.

Insert Table 3 Here

The correlations between test anxiety and task ease/difficulty attributions show the general task ease/difficulty items are significantly correlated with test anxiety for both conditions. After success "your finding most tasks easy" was negatively correlated, and "your finding most tasks difficult" was positively correlated, with test anxiety. After failure "your finding most tasks difficult" was positively correlated ith test anxiety. It appears that the high-test-anxious subjects, in comparison to low-test-anxious subjects, tended to explain their performance, regardless of condition, as a result of finding most tasks difficult or not easy. After failure, positive correlations were observed between test anxiety and "your trying hard while working on the anagrams" and "your usually trying hard while working on a task". After success test anxiety and "your having bad luck on the anagram task today" were positively correlated. This demonstrates that low test-anxious subjects to a greater extent than high-test-anxious subjects felt their performance was caused by bad luck. Attributing successful performance to bad luck may mean that high-test-anxious subjects viewed the success situation more negatively than did low-test-anxious subjects.

Following success test anxiety was positively correlated with "your being in a bad mood today" and "your usually being in a bad mood." In this condition high-test-anxious subjects attributed their successful performance to being in a bad mood to a greater extent than low-test-anxious subjects. After failure test anxiety was unexpectedly positively correlated with "your being in a good mood today", "your usually being in a bad mood" and "your usually being in a good mood". It appears that after success high-test-anxious subjects explained their performance by being in worse moods than low-test-anxious subjects. After failure high-test-anxious subjects explained their performance by being in a better mood than low-test-anxious subjects.

The obtained correlations between test anxiety and time pressure attributions show that after success test anxiety was positively correlated with "your feeling pressured by the time limit", and "everyone not feeling pressured by the time limit". After failure test anxiety and "your feeling pressured by the time limit" were positively correlated. In both conditions high-test-anxious individuals tended to attribute their performance to being more pressured by time limits.

Discussion

This research investigated the relationship between test anxiety and causal attributions following success and failure in an achievement situation. The hypothesized relationships among these variables were tested using correlational analysis. The correlational analysis showed that test anxiety was significantly correlated with items constructed to measure causal attributions. High-test-anxious subjects believed that when they failed, they did so because of lacking general ability to a greater extent than low-test-anxious subjects. Regardless of condition,

the high-test-anxious subjects to a greater extent than low-test-anxious subjects attributed their performance to finding most tasks difficult. The attribution items differentiating high-test-anxious subjects from low-test-anxious subjects were general rather than specific items. This suggests an unchanging and negative perception of personal causality and efficacy by high-test-anxious subjects.

High-test-anxious subjects in comparison to low-test-anxious subjects reported that their performance was caused by exerting more effort following failure, bad luck following success, being in worse moods after success and because of experiencing more time pressure. Negative cognitive and emotional components, in addition to worry, off task thinking and emotional arousal, appear characteristic of the high-test-anxious person's experience. The data reported here suggest this includes a tendency to personalize failure, minimize success and in general experience testing situations negatively.

The following is a discussion of issues concerning attribution measurement and the possible meaning subjects may have attached to the attribution items. Subjects were asked to respond to each of twenty-nine attribution items and record their responses on a separate answer sheet. A problem with this measurement strategy is the length and format of the attribution questionnaire. It is possible subjects forgot their purpose due to the length and format of the questionnaire. Instead of evaluating the extent to which each item was a cause of their performance in this situation, subjects may have responded based on typical self perceptions and causal attributions for their performance.

The attribution questionnaire contained items that were designed to be consistent with causal explanations of both success and failure. One half the items made sense when used in reference to success (e.g. explaining success by attributing performance to high general ability), and one half

the items made sense when used in reference to failure (e.g. explaining failure by attributing performance to lacking anagram solving ability). An inconsistent situation exists when items appropriate for success appear to be used to explain failure or when items appropriate for failure appear to be used to explain success. For example, the positive correlation between test anxiety and "your having low general ability" after success is inconsistent. It is difficult to understand why a person would believe his/her successful performance is caused by having low general ability. Reviewing the data displayed in Table 3, focusing on the inconsistent attribution-test anxiety correlations, suggests a general negative self concept and negative perceptual bias colors a high-test-anxious person's experience. Nearly all of the inconsistent item correlations show high-test-anxious subjects experiencing a positive situation (success) more negatively than low-test-anxious subjects (except for the positive correlation between test anxiety and good mood after failure).

After success, test anxiety was positively correlated with low general ability, finding most tasks difficult, having bad luck on the anagram task, being in a bad mood and feeling pressured by time. After failure test anxiety was positively correlated with trying hard. All of these correlations seem consistent with the hypothesis that poor self-concept and a negative perceptual bias is related to both test anxiety and the way subjects answered questionnaire items.

Perceived success and failure were manipulated in this study by providing subjects with false normative information while holding task performance consistent across both conditions. All manipulation check items showed slight and appropriate perceptions of success and failure and statistically significant group differences. However, the actual magnitude of

these differences were small (about 1.5 scale points on a 9 point Likert scale). It is possible that a stronger manipulation would have resulted in more pronounced relationships between test anxiety and attributions. It is also possible that subjects defined success and failure differently than did the experimenter. Correlations between the manipulation check items and a dummy variable coded for condition showed reasonable correlations between these variables in the expected direction (-.40, .34, - .31; $p \leq .001$). However, the correlations show that only between 9% and 16% of the variance in subjects' perceptions can be related to the objective condition.

Subject perceptions were manipulated differently in this study than in some other studies where normative data were used to manipulate perceptions of success and failure. Here all instructions to subjects were administered in written form to groups consisting of subjects in both conditions. In other studies normative data are often presented verbally to subjects in large groups. An advantage of the procedure used here is that perceptions are manipulated at the individual level and the individual is clearly the unit of analysis. With group manipulations the actual unit of analysis is ambiguous. A disadvantage of the manipulation used in this study is that all subjects may not have carefully read instructions and information related to the manipulation. This could have resulted in a weak manipulation of perceived success and failure. The manipulation of success and failure used in this study minimally affected subjects' perceptions of success and failure. In future research a stronger manipulation of subjects' perceptions of success and failure would be desirable.

Attribution items were constructed that were consistent with general (global) and specific attribution dimensions as presented by Abramson, Seligman and Teasdale (1978). The actual meaning of global and specific

as they relate to attributions needs thoughtful conceptual clarification. This includes whether or not global and specific refer only to the individual or to others (see the ability and luck attribution items used in this study). What are the conceptual extremes of an attribution item? For example, for global and specific ability, should the extremes be anagram ability and general ability (as used here), or is it more appropriate to become more general and consider general attributions to one's entire self-worth?

At a conceptual level, the interrelationships among the internal/external, stable/unstable and global/specific dimensions need further clarification. For example, there is little practical difference in attributing performance to "lacking general ability" (an internal, stable, general attribution) or to "finding most tasks difficult" (an external, stable, general attribution). The task difficulty attribution at a global level becomes indistinguishable to this writer from an internal general ability attribution. Weiner raises a similar point in his discussion of the impact of including the dimension intentionality in his attribution model. This results in nonorthogonality among attributions (Weiner, Russell, Lemar, 1978).

A question central to attribution theory research is whether or not people actually make causal attributions independent of attribution assessment procedures. People may make attributions only in response to questions designed to measure attributions. If this is the case, researchers are studying a phenomenon they are creating. Using open-ended questions to measure attributions, Frieze and her associates (Frieze, 1976; Elig and Frieze, 1979) have attempted to determine which attributions subjects actually use to explain their performance in achievement situations. However, the format of the question asked ("Why do you think you succeeded (failed)

on this task?") prevents answering the question as to whether or not people, independent of questioning, try to explain their performance in achievement situations. Basic research in this area needs to determine when and if people make attributions. One possibility is to ask subjects very unstructured questions such as "What are you thinking right now?" after finishing an achievement task. Questions like this or other thought listing approaches will help determine if subjects spontaneously try to explain their performance immediately after it occurs. In addition, varying the time lag between performance and attribution measurement may result in observing differences in attributions as a function of time.

This research has implications for both test anxiety theory and treatment. First, the data presented show that test anxiety is correlated with the construct or constructs measured by the attribution items. If high-test-anxious individuals perceive causality differently from low-test-anxious individuals, theories of test anxiety need to incorporate such a causal component. Conceptually this work is well underway (e.g. Weiner, 1982). Treatment of test anxiety also needs to attend to the causal attribution component of experienced test anxiety. If a high-test-anxious person does inappropriately personalize failure and discount success as this research suggests, the most effective treatment strategy must incorporate appropriate techniques to reduce this aspect of the condition. Abramson, Seligman and Teasdale (1978) discuss some possible treatment strategies. Additional research opportunities exist on the treatment side of the test anxiety and attributional style question. Assuming attributional style differences exist, what are the possible treatments that are useful in changing self-defeating and erroneous causal perceptions? Which treatment strategies are most effective for what kind of person?

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TABLE 1

Group Equivalence and Manipulation Check Variables

	Success			Failure			
	M	SD	N	M	SD	N	t
Group Equivalence Variables							
Test Anxiety Scale	17.84	7.12	97	18.48	7.10	103	.64
Cognitive Interference Scale	3.70	2.42	97	4.04	2.13	103	1.07
Emotionality Scale	9.90	4.61	97	10.17	4.78	103	.42
Negative Test Taking Attitude Scale	3.15	1.28	97	3.10	1.44	103	-.30
Age	19.37	2.16	97	20.33	4.82	102	1.83
Grade Point Average	2.64	.70	89	2.57	.52	82	-.70
Days between Session One and Two	8.38	3.44	97	8.39	3.04	103	.02
Perceptions of Success and Failure							
Anagram Performance Success - Failure [a]	4.09	1.67	96	5.51	1.57	103	6.20*
Extent Anagram Performance A Success [a]	5.46	1.67	97	4.27	1.65	100	-5.04*
Extent Anagram Performance A Failure [b]	3.59	1.71	97	4.81	2.07	103	4.52*

a Success = 1, failure = 9
b 1 = not at all, 9 = a great deal

* $p \leq .001$

TABLE 2

Means and Standard Deviations of Attributions Following Success and Failure.

Attribution	Success M	Success SD	Success N	Failure M	Failure SD	Failure N	t
Ability							
ability or lack of ability	5.11	1.79	97	5.05	2.00	102	-.24
your having low general ability	2.69	2.02	97	2.65	1.82	102	-.16
your having high general ability	5.48	1.97	97	4.41	2.36	102	-3.47 ***
your having low anagram solving ability	4.43	2.15	97	4.79	2.29	103	1.12
your having high anagram solving ability	4.01	1.99	97	3.31	1.84	103	-2.59 **
Task Difficulty							
anagrams being difficult or easy	6.55	2.08	93	6.17	2.33	102	-1.20
your finding the anagrams easy	4.99	1.86	96	3.99	1.76	103	-3.89 ***
your finding the anagrams difficult	4.84	1.91	97	4.74	2.08	103	- .34
your finding most tasks easy	4.68	1.92	97	3.78	2.18	103	-3.11 **
your finding most tasks difficult	3.86	2.08	96	3.54	2.02	102	-1.12
Effort							
working hard or not working hard	4.64	2.14	97	3.90	2.39	103	-2.29 *
your not trying hard while working on the anagrams	3.46	2.21	97	3.20	2.22	100	- .84
your trying hard while working on the anagrams	5.14	2.11	97	4.10	2.27	103	-3.38 ***
your usually not trying hard while working on a task	2.94	1.78	96	2.58	1.84	103	-1.38
your usually trying hard while working on a task	6.24	1.92	97	5.27	2.67	102	-2.93 **

Attribution	Success M	Success SD	Success N	Failure M	Failure SD	Failure N	t
Luck							
luck or bad luck	4.02	2.16	95	3.61	2.23	102	-1.32
your having bad luck on the anagram task today	3.27	2.03	96	3.24	2.14	102	- .12
your having good luck on the anagram task today	3.26	1.82	97	2.67	1.82	102	-2.29 *
everyone having good luck on the anagram today	2.55	1.73	95	2.46	1.70	103	- .37
everyone having bad luck on the anagram task today	2.46	1.67	96	2.65	1.91	102	.74
Mood							
being in a good or bad mood	4.03	2.30	95	3.99	2.73	102	- .11
your being in a bad mood today	2.95	2.28	96	3.36	2.57	102	1.20
your being in a good mood today	3.39	2.30	97	2.88	2.06	103	-1.65
your usually being in a bad mood	2.38	1.79	97	2.76	1.72	102	- .47
your usually being in a good mood	4.35	2.71	96	3.88	2.51	102	-1.27
Time Pressure							
your feeling pressured by the time limit	6.08	2.46	95	6.18	2.56	103	.28
your not feeling pressured by the time limit	3.26	2.50	96	2.50	2.12	103	-2.31
everyone feeling pressured by the time limit	4.30	2.52	92	4.30	2.78	103	- .01
everyone not feeling pressured by the time limit	2.82	1.92	90	2.51	1.91	97	-1.13

Note t-test is based on pooled variance estimate when variances are equal. It is based on the separate variance estimate when variances are unequal.

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

TABLE 3

Correlations Between Test Anxiety and Causal Attributions Following Success and Failure

Attribution	Test Anxiety Success	Failure
Ability		
ability or lack of ability	.01	.04
your having low general ability	.18 *	.42 ***
your having high general ability	-.20 *	-.04
your having low anagram solving ability	.08	.04
your having high anagram solving ability	-.16	-.03
Task Ease/Difficulty		
anagrams being difficult or easy	.05	-.17 *
your finding the anagrams easy	-.05	-.05
your finding the anagrams difficult	.13	.08
your finding most tasks easy	-.24 **	-.08
your finding most tasks difficult	.26 **	.45 ***
Effort		
working hard or not working hard	.09	.01
your not trying hard while working on the anagrams	.08	.05
your trying hard while working on the anagrams	.03	.29 ***
your usually not trying hard while working on a task	.12	-.02
your usually trying hard while working on a task	-.02	.23 **
Luck		
luck or bad luck	.17 *	.00
your having bad luck on the anagram task today	.26 **	.07
your having good luck on the anagram task today	.09	.06
everyone having good luck on the anagram task today	.15	.16
everyone having bad luck on the anagram task today	.16	.11
Mood		
being in a good or bad mood	.22 *	.12
your being in a bad mood today	.23 *	.12
your being in a good mood today	.09	.21 *
your usually being in a bad mood	.36 ***	.17 *
your usually being in a good mood	.08	.19 *
Time Pressure		
your feeling pressured by the time limit	.17 *	.18 *
your not feeling pressured by the time limit	.11	.00
everyone feeling pressured by the time limit	.06	.05
everyone not feeling pressured by the time limit	.19 *	.04

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$